Governmental and Statistical Enterprise Architectures as Tools for Modernizing the National Statistical System

Timo Koskimäki[1],Ville Koskinen[2]

[1] *Statistics Finland, Helsinki, Finland, timo.koskimaki@stat.fi*
[2] *Statistics Finland, Helsinki, Finland, ville.koskinen@stat.fi*[1]

Abstract

Enterprise Architecture (EA) frameworks provide an abstraction of an enterprise by modeling it using architectural perspectives - business, data, applications and technologies – and different levels of detail– abstract, logical, physical. The statistical community has adopted ideas from Enterprise Architecture frameworks like the Common Statistical Production Architecture (CSPA) and the ESS Enterprise Architecture Framework. On the other hand, national architecture standards governing the architecture of all public administration are being set up. The paper discusses the gaps and overlaps of the two frameworks from a NSI point of view.

Keywords: (1-5 words), Enterprise Architecture, Public Administration, National Statistical Institute, European Statistical System

1. The Driver: Digitalization

Digitalization, the use of digital technologies to change business models and provide new revenue and value-producing opportunities is the key driving factor for a number of societal changes we are facing today. The new possibilities that emerge from the use of digital

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technologies is changing the business processes also in the public sector, including official statistics.

One of the solutions to cope with the opportunities and challenges of the new digital world has been the establishment of enterprise architecture (EA) schemes. EA schemes consist typically of a set of standards, standardised processes and procedures, supposed to be implemented throughout the whole organisation. EA's also include a management model aimed to ensure that the organisation complies with the EA standards when running and developing the business.

In the following, we describe briefly the contents of two such frameworks, a national one (the Finnish Public Sector EA framework) and an international one (UNECE/ESS EARF) and discuss the issues that arise from the fact that NSI's are facing two different standardisation initiatives.

The statistical community has recognized the issue of multiple standardization initiatives. UNECE (2014) states the following: Collaboration and harmonization can be across government at the national level, or they can be across the "official statistical industry" at the international level. Whilst recognizing that reconciling these two approaches can be challenging, this [UNECE] vision focuses on the international dimension, for the simple reason that considerations at the national level are often very country-specific.

We would slightly challenge the UNECE notion that standardization considerations at the national level are country-specific. Simply due to the fact that EA's as an approach have a common background (TOGAF, Zahlman et.c.), the applications in various fields tend to look rather similar. If we work proactively, we might be able to provide some of our standardization tools also to the rest of the public sector.

We wrote the paper from the perspective of a smallish NSI operating in a country where information from administrative registers is extensively used for the compilation of official statistics. We think, though, that the observations we make will be applicable to most NSI's in

the near future. For the first, the use of administrative data is increasing in all statistical offices. For the second, because of the digitalization of the private sector business processes, also the data we obtain from the enterprises will in the future look like the administrative data, as it will be derived directly from the enterprises' information systems.

2. The EA frameworks

2.1 The Statistical Community

The UNECE (2014, first version 2011) sketched the challenge of digitalization dividing it in to two aspects, one concerning statistical products and the other concerning production processes of statistical organizations:

- On statistical products: Statistical organizations no longer have a monopoly on the means to inform society about social and economic developments. Others are starting to create outputs in competition with ours, and although we may question the accuracy of some of these outputs, it is undeniable that they are often more timely, more easily accessible, and better promoted.

- On statistical production process: The changes in our society drive the need for more and quicker statistics. Quality is multi-faceted, with different users placing different emphasis on dimensions such as accuracy and timeliness. The challenge for statistical organizations is to be sufficiently flexible and agile to provide statistics according to user needs, at an acceptable cost. Statistical organizations are starting to acknowledge that it is becoming too expensive for each and every one of them to individually change their tailored production systems to meet user expectations.

Since the coining of the UNECE modernization vision in 2011, the statistical community, both in the context of the UNECE statistical work and within the ESS, has invested a lot to different aspects of statistical standardization work. The most notable results are the following:

- Creation and/or enhancement of a set of statistical standards for the modernization work (CSPA, GSBPM, GSIM, GAMSO) by the UNECE statistical community. The set can be characterized as the global EA framework for official statistics (UNECE 2014, see Vale 2014 for a quick summary and annex 1)

- Creation of the ESS 2020 Vision and associated management structures to steer the development of European Statistics (ESS 2014)

- Creation of the ESS enterprise architecture framework (Eurostat 2016, see annex 2)

2.2 A national EA -approach

In Finnish statistical services, the re-use of administrative data for statistical purposes has been common practice for about 3 decades, one of the milestones being the entirely register-based Census as of 1990.

For the rest of the Finnish public sector, however, the merging and re-use of other administrations' data has been far less common. First ideas of more extensive data sharing within the public sector emerged some ten years ago. In its early stages, the main driver related to modern ICT that provided new possibilities to enhance the efficiency of the public sector. This was supposed to happen by developing two areas:

- By providing possibilities to digitalize the public services provided to citizens and enterprises

- By enhancing the possibilities to knowledge-based management of the public sector organizations and, more generally, enhancing the possibility to evidence-based policy-making.

The idea of digitalization resulted in an entirely new field of public policy, the information policy. So far, the information policy –initiative has led to following practical measures:

- Establishment of a dedicated information policy unit under the ministry of the finances ("Public sector ICT")

- A set of legislation enabling digitalization like the act on the governance of the public sector ICT

- A set of national standards and guidelines like the public sector Enterprise Architecture –framework and public sector services architecture (see annex 1 and annex 2).

- A set of joint public sector ICT-infrastructure services like the "national service bus" which is the gateway that enables, among other things, the data sharing between organizations.

The focus of the development work has now shifted from the technically oriented ICT-development to more substantial initiatives that rely on the infrastructures (or forthcoming infrastructures) specified and set up by the public sector ICT-administration.

The current work consists of two streams: For the first, a number of legal acts are being revised in order to enhance the use of public sector data, including data sharing. For the second, new information systems are being set up. From a NSI point of view, the most important ongoing initiatives are the following:

- Establishment of "the national register on income" aiming to provide a centralized gateway and associated information systems between enterprises and public administration for all reporting relating to employment (wages and salaries, work-related insurance schemes).

- Establishment of a new centralized information systems relating to education

- Establishment of a new centralized information system in the field of health and social security

- Establishment of a new centralized information system for local government finances

One scenario for the near future is that we will see a number of sector-specific data – service agencies – a kind of "Sectoral Data Institutes"- that manage, merge and redistribute administrative data coming from their own field of administration. In essence, they will be doing the same job as the NSI is doing. Also, to establish a centralized new authority for the merging and sharing of the public sector data between administrations – a kind of "National Data Institute" has been proposed. No practical measures to create such an institution has been taken, though. It remains to be seen what is the relationship and division of tasks between the NSI and the emerging SDIs or NDI.

2.3 Comparison of different EA-approaches

In annex 1 we provide a mapping between the UNECE – CSPA architecture framework and the general view of Finnish public sector enterprise architecture. Annex 2 provides a mapping between two more detailed architecture presentations, the Finnish public sector target architecture and the ESS reference EA. The sources for EA descriptions in the annexes are Ministry of Finances (2016), Eurostat (2016) and UNECE (2014).

The main observation is that it is easy to map the statistical EAs to national EA, at least in the case of Finland. The same key elements appear in both frameworks, often even under the same general heading. As it comes to the more detailed levels of the EAs, we can expect differences. The question posed in the beginning of this paper, which architecture framework to follow, national or international, is therefore highly relevant.

3. Conclusions

Statistics Finland is participating to the work to implement the national reference architecture. The initiatives we are currently participating are listed in paragraph 2.2 above. In some of the initiatives, we are members of the steering bodies, in others we also participate to the practical development work, especially on the field of health and social security. At the same time, we internally attempt to utilize the international standards-based modernization. Our conclusions so far:

- Working with EA frameworks is challenging due to high level of abstraction. Even within our NSI, it is difficult to communicate on things like information models or data definitions. It is even more difficult to communicate the elements of frameworks to other administrations.

- The multitude of frameworks increases the challenge of communication. One of my senior colleagues put it: "These (2*EA, 2*Quality, Risk management, Project management et.c.) frameworks are coming in from doors and windows".

- The multitude of frameworks, all of which seem to include their own type of management structure, poses a management challenge to a NSI. A NSI that took seriously the entire set of management proposals in EA and other existing frameworks would be a monstrous bureaucracy.

- There is a capability gap/shortage of resources in the NSI concerning standardization tools, especially on information modelling (GSIM, DDI)

- The capability gap is even more pronounced in other parts of the public sector

- The international statistical work on the standards-based modernization is still on the pioneering phase. We would urgently need success stories on practical applications on the use of the standards (like CSPA and GSIM).

- Avoid too detailed and heavy international/ESS standardization work as it will anyway conflict with the national initiatives (EARF already too detailed except for Eurostat internal purposes?)

- Concentrate international/ESS standardization work on areas where there is capability gap in other sectors of public administration. Based on Finnish experience the "Information" section of the FI national EA modelling section would be a good candidate. In UNECE EA that would be the GSIM-corner and in EARF the information layer.

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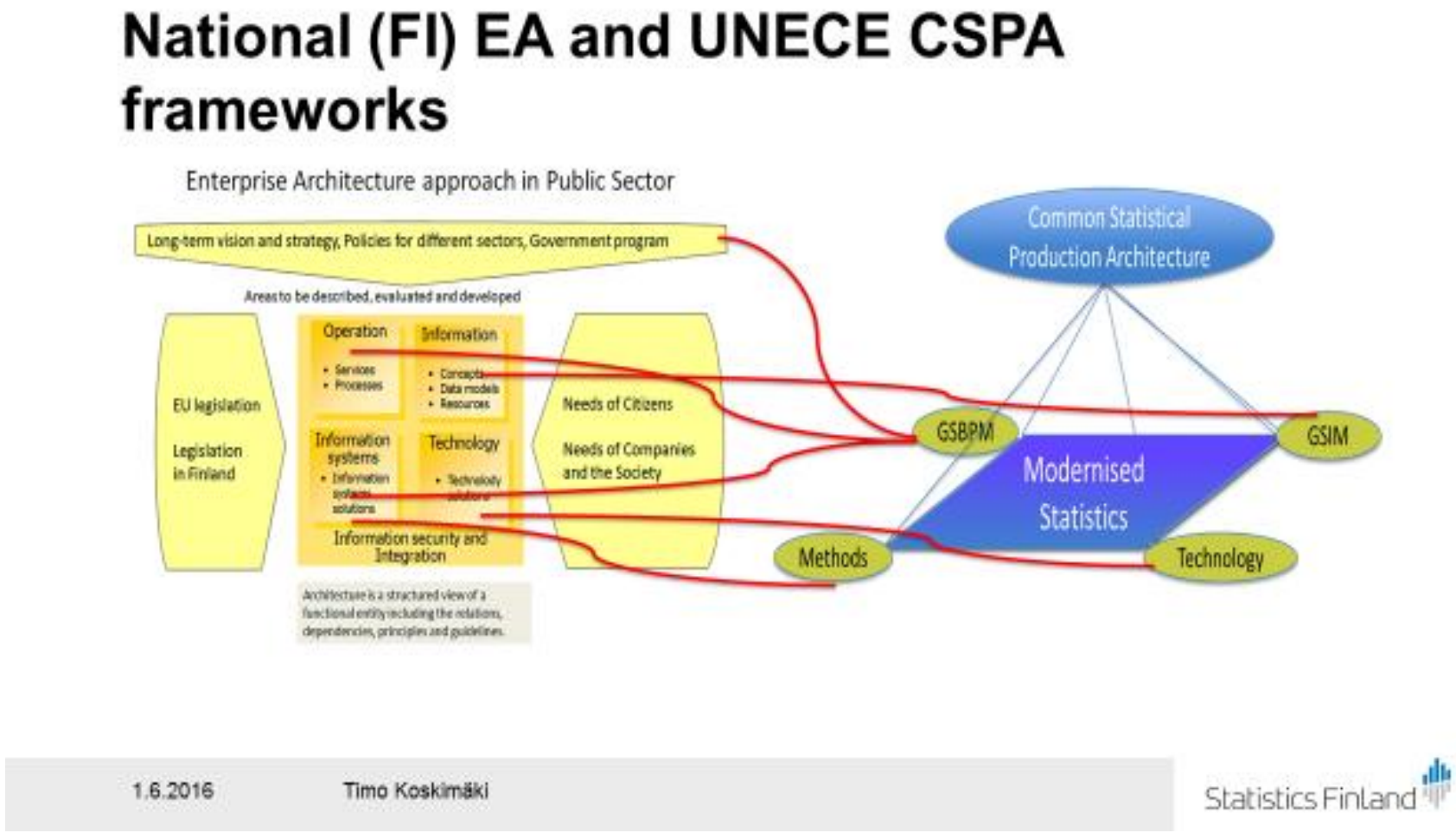
Annex 1: Mapping of National (FI) EA and UNECE CSPA frameworks



Annex 2: Mapping of the ESS and National (FI) target architectures